



## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

### Funding Highlights:

- Adds \$6 billion to NASA's budget over five years and draws upon American ingenuity to enable us to embark on an ambitious 21st Century program of human space exploration.
- Initiates flagship exploration technology development and demonstration programs of “game-changing” technologies that will increase the reach and reduce the costs of future human space exploration as well as other NASA, government, and commercial space activities.
- Embraces the commercial space industry and the thousands of new jobs that it can create by contracting with American companies to provide astronaut transportation to the Space Station—thus reducing the risk of relying exclusively on foreign crew transport capabilities.
- Ends NASA's Constellation program, which was planning to use an approach similar to the Apollo program to return astronauts back to the Moon 50 years after that program's triumphs. An independent panel found that Constellation was years behind schedule and would require large budget increases to land even a handful of astronauts back on the Moon before 2030. Instead, we are launching a bold new effort that invests in American ingenuity for developing more capable and innovative technologies for future space exploration.
- Extends the International Space Station and enhances its utilization, bringing nations together in a common pursuit of knowledge and excellence in space.
- Enhances the Nation's global climate change research and monitoring system, including re-flight of a satellite that will help identify global carbon sources and sinks.
- Provides for a robust program of robotic solar system exploration and new astronomical observatories, including a probe that will fly through the Sun's atmosphere and an expanded effort to detect potentially hazardous asteroids.
- Revitalizes and realigns NASA to put in place the right workforce and facilities to function as an efficient 21st Century research and development agency.

The mission of the National Aeronautics and Space Administration (NASA) is to drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, stewardship of the Earth, and solutions to national and global challenges. The

President's Budget will allow NASA to improve our knowledge of the Earth, explore space with humans and robots, foster strong partnerships with other nations, and educate and inspire the next generation of scientists and engineers.

**Lays the Foundation for a Bold New Course for Human Space Flight.** NASA's Constellation program—based largely on existing technologies—was begun to realize a vision of returning astronauts back to the Moon by 2020. However, the program was over budget, behind schedule, and lacking in innovation due to a failure to invest in critical new technologies. Using a broad range of criteria, an independent review panel determined that even if fully funded, NASA's program to repeat many of the achievements of the Apollo era, 50 years later, was the least attractive approach to space exploration as compared to potential alternatives. Furthermore, NASA's attempts to pursue its Moon goals had drawn funding away from other NASA programs, including robotic space exploration, science, and Earth observations. The President's Budget cancels Constellation and replaces it with a bold new approach that invests in the building blocks of a more capable approach to space exploration that includes:

- Research and development to support future heavy-lift rocket systems that will increase the capability of future exploration architectures with significantly lower operations costs than current systems—potentially taking us farther and faster into space.
- A vigorous new technology development and test program that aims to increase the capabilities and reduce the cost of future exploration activities. NASA, working with industry, will build, fly, and test in orbit key technologies such as automated, autonomous rendezvous and docking, closed-loop life support systems, in-orbit propellant transfer, and advanced in-space propulsion so that our future human and robotic exploration missions are both highly capable and affordable.
- A steady stream of precursor robotic exploration missions to scout locations and demonstrate technologies to increase the safety and capability of future human missions and provide scientific dividends.

**Develops and Deploys Technologies to Reduce Future Space Mission Costs, Expand Opportunities, and Grow the American Economy.** NASA will embark on a new agency-wide technology development and test program aimed at increasing the capabilities and reducing the cost of future NASA, other government, and commercial space activities. NASA will increase its support for transformative research that can enable a broad range of NASA missions. This program, which will involve work at NASA, in private industry, and at all levels of academia, will also generate spin-off technologies and potentially entire new industries.

**Supports Extension and Enhanced Utilization of the Space Station.** The International Space Station is poised to reach its full complement of international crew and laboratories in 2010. The President's Budget provides funds to extend operations of the Space Station past its previously planned retirement date of 2016. Working with partners around the world, NASA will maximize return on this investment by deploying new research facilities to conduct scientific research and test technologies in space and by making Space Station research capabilities available to educators and new researchers. New capabilities could include a centrifuge to support research into human physiology, inflatable space habitats, and a program to continuously upgrade Space Station capabilities.

**Supports Promising Commercial Space Transportation.** Commercial launch vehicles have for years carried all U.S. military and commercial—and most NASA—satellites to orbit. The Budget funds NASA to contract with industry to provide astronaut transportation to the International Space Station as soon as possible, reducing the risk of relying solely on foreign crew transports for years to come. A strengthened U.S. commercial space launch industry will bring needed competition, act as a catalyst for the development of other new businesses capitalizing on affordable access to space, help create thousands of new jobs, and help reduce the cost of human access to space.

**Commits Funds to Safely and Prudently Fly the Remaining Space Shuttle Flights.**

The President's Budget promotes a safe and orderly retirement of the Space Shuttle program by providing funding for the Shuttle to fly its final five missions, even if their schedule slips into 2011.

**Improves Our Understanding of Global Climate Change.** NASA's Earth science program conducts first-of-a-kind demonstration flights of sensors in air and space in an effort to foster scientific understanding of the Earth system and to improve the ability to forecast climate change and natural disasters. The Budget accelerates the development of new satellites the National Research Council recommended as Earth science priorities. The Budget also supports several research satellites currently in development, a campaign to monitor changes in polar ice sheets, and enhancements to climate models. In addition, the Budget provides funds for NASA to develop and fly a replacement for the Orbiting Carbon Observatory, a mission designed to identify global carbon sources and sinks that was lost when its launch vehicle failed in 2009.

**Increases Scientific Understanding of the Solar System and Universe.** NASA's space probes, rovers, and telescopes have revolutionized humanity's scientific understanding of the cosmos. The Budget supports space science research grants and dozens of operating missions and telescopes currently studying the planets and stars as well as many more in development—including a telescope to succeed the Hubble Space Telescope, missions to study the Moon, and two Mars exploration missions. The Budget also funds early work on a mission that will make the closest-ever approach to the Sun, flying through

its outer atmosphere in an attempt to understand how it is heated and how it ejects the stream of charged particles known as the solar wind. In addition, the Budget increases funding to detect asteroids that could potentially pose a hazard to the Earth.

**Increases Support for Green Aviation and a More Efficient Air Transportation System.** The President's Budget increases support for NASA's green aviation initiative by focusing on both innovative fundamental research and systems-level applications to reduce fuel needs, noise, and emissions of aircraft. These improvements to future air transportation will promote both the economic and environmental health of this country.

**Revitalizes and Realigns NASA.** The Budget supports the revitalization of NASA to put in place the right workforce and facilities to function as an efficient 21st Century research and development agency. A major focus of this effort will be to create the 21st Century launch facilities and infrastructure needed at Kennedy Space Center, transforming the facility to more effectively support future NASA, commercial, and other government launches.

**Inspires More Young People to Engage in Science, Technology, Engineering, and Mathematics.** The Budget supports NASA programs that are designed to meet the goals of the President's "Educate to Innovate" campaign in Science, Technology, Engineering and Mathematics education. NASA's Summer of Innovation, for example, will work with thousands of middle school teachers and students to engage students in stimulating, evidence-based math and science-based education programs.

**National Aeronautics and Space Administration**  
(In millions of dollars)

	Actual 2009	Estimate	
		2010	2011
<b>Spending</b>			
Discretionary Budget Authority:			
Science .....	4,503	4,469	5,006
Exploration .....	3,505	3,746	4,263
Aeronautics and Space Research and Technology .....	500	501	1,152
Space Operations .....	5,765	6,147	4,888
Education .....	169	183	146
Cross Agency Support .....	3,306	3,194	3,111
Construction and Environmental Compliance and Restoration .....	—	448	397
Inspector General .....	34	36	37
Total, Discretionary budget authority .....	17,782	18,724	19,000
<i>Memorandum:</i>			
<i>Budget authority from American Recovery and Reinvestment Act .....</i>	<i>1,002</i>	<i>—</i>	<i>—</i>
Total, Discretionary outlays .....	19,138	18,347	17,694
<i>Memorandum: Outlays from American Recovery and Reinvestment Act .....</i>	<i>37</i>	<i>790</i>	<i>183</i>
Mandatory Outlays:			
All Other General Funds and Proprietary Receipts .....	−6	−15	−15
Undistributed Intragovernmental Payments and Receivables .....	−2	—	—
Science, Space, and Technology Education Trust Fund .....	1	1	1
Total, Mandatory outlays .....	−7	−14	−14
Total, Outlays .....	19,131	18,333	17,680